

SI Dataset 1-Methane stable and clumped isotope data for natural gas basins in this study

Country	Field / Protraction	Sample Type	Reservoir Temp (°C)	δD (‰)	$\delta^{13}C$ (‰)	Δ_{18} (‰)	1 SE	T(Δ_{18}) (°C)	1 SE (°C)
USA	Haynesville	Produced gas	163	-144.34	-38.91	2.7	0.26	198	15
USA	Haynesville	Produced gas	190	-129.80	-35.24	2.9	0.27	185	15
USA	Haynesville	Produced gas	170	-131.91	-35.96	3.1	0.27	169	13
USA	Haynesville	Produced gas	183	-132.68	-35.43	2.8	0.26	189	14
USA	Haynesville	Produced gas	187	-130.20	-35.40	2.6	0.26	207	15
USA	Marcellus	Produced gas	60	-153.54	-35.83	3.0	0.24	179	12
USA	Marcellus	Produced gas	62	-155.56	-35.79	2.6	0.26	207	15
USA	Marcellus	Produced gas	70	-156.19	-34.22	2.8	0.25	195	13
USA	Marcellus	Produced gas	48	-199.48	-44.09	2.3	0.25	245	19
USA	Marcellus	Produced gas		-199.83	-44.12	2.8	0.25	191	13
USA	Marcellus	Produced gas	34	-158.63	-27.05	3.3	0.25	155	10
USA	Hadrian, Keathley Canyon	Solution gas MDT	50	-237.00	-55.98	4.1	0.25	101	15
USA	Hadrian, Keathley Canyon	Solution gas MDT	42	-173.87	-60.40	6.0	0.26	34	5
USA	Hadrian, Keathley Canyon	Solution gas MDT	48	-173.68	-58.05	5.6	0.24	48	5
USA	Hoover-Diana, Alaminos Canyon	Produced solution gas	70	-202.88	-60.37	3.8	0.24	118	14
USA	Hoover-Diana, Alaminos Canyon	Produced solution gas	71	-204.86	-59.07	4.4	0.22	88	12
USA	Hoover-Diana, Alaminos Canyon	Produced gas	59	-192.49	-57.05	5.3	0.25	52	11
USA	Hoover-Diana, Alaminos Canyon	Produced gas	54	-194.95	-56.27	4.9	0.24	70	8
USA	Hoover-Diana, Alaminos Canyon	Produced solution gas	54	-194.90	-56.38	5.0	0.25	63	11
USA	Hoover-Diana, Alaminos Canyon	Produced solution gas	69	-200.45	-57.80	4.5	0.25	86	10
USA	Hoover-Diana, Alaminos Canyon	Produced solution gas	68	-200.40	-58.47	4.5	0.25	85	11
USA	Julia / Walker Ridge	Solution gas MDT	106	-272.00	-59.16	2.9	0.25	180	17
USA	Julia / Walker Ridge	Solution gas MDT	115	-300.20	-57.73	3.7	0.25	123	16
USA	Julia / Walker Ridge	Solution gas MDT	106	-271.10	-57.93	3.1	0.25	162	19
USA	Julia / Walker Ridge	Solution gas MDT	110	-267.30	-59.20	3.6	0.25	128	15
USA	Genesis, Green Canyon	Produced solution gas	71	-195.00	-57.70	4.0	0.25	106	13
USA	Genesis, Green Canyon	Produced solution gas	63	-195.40	-57.25	4.4	0.25	91	10
USA	Genesis, Green Canyon	Produced solution gas	69	-191.10	-59.71	5.2	0.25	57	9
USA	Genesis, Green Canyon	Produced solution gas	71	-192.20	-61.20	4.8	0.25	73	11
USA	Genesis, Green Canyon	Produced solution gas	68	-193.20	-58.70	4.0	0.25	109	13
USA	Genesis, Green Canyon	Produced solution gas	66	-198.80	-54.96	4.1	0.25	97	19
USA	Genesis, Green Canyon	Produced solution gas	81	-191.10	-64.10	5.8	0.25	36	8
USA	Genesis, Green Canyon	Produced solution gas	79	-194.00	-63.40	5.7	0.25	39	8
USA	Genesis, Green Canyon	Produced solution gas	82	-192.70	-62.90	5.8	0.25	35	8
USA	Galveston 209	Produced solution gas	94	-149.80	-41.74	2.6	0.25	200	23
USA	Galveston 209	Produced solution gas	103	-147.00	-40.54	2.8	0.25	187	21

USA	Galveston 209	Produced solution gas	91	-149.60	-41.54	3.2	0.25	152	17
USA	Galveston 209	Produced solution gas	89	-150.80	-41.91	3.6	0.25	130	16
Canada	Medicine Hat	Produced gas	16	-245.96	-67.17	4.9	0.25	69	10
Canada	Medicine Hat	Produced gas	16	-238.84	-68.66	4.8	0.25	74	10
USA	Sacate, SYU	Produced solution gas	105	-153.76	-37.57	2.7	0.25	194	21
USA	Pescado, SYU	Produced solution gas	90	-186.60	-47.69	3.7	0.25	122	17
Germany	Rotliegend	Produced gas	158	-115.00	-26.20	2.2	0.22	239	27
Germany	Rotliegend	Produced gas	159	-115.00	-26.26	2.6	0.26	206	20
Germany	Rotliegend	Produced gas	159	-113.50	-25.42	2.5	0.24	206	28
Germany	Rotliegend	Produced gas	161	-112.10	-26.10	2.0	0.25	267	30
Germany	Rotliegend	Produced gas	157	-111.50	-25.95	2.7	0.24	193	21
Germany	Rotliegend	Produced gas	158	-113.30	-25.54	2.2	0.25	242	28
Germany	Rotliegend	Produced gas	156	-113.80	-25.83	2.2	0.25	244	26
Germany	Rotliegend	Produced gas	160	-111.50	-26.07	2.3	0.25	225	33
Germany	Rotliegend	Produced gas	165	-109.80	-25.63	3.2	0.25	154	19
Germany	Rotliegend	Produced gas	159	-112.00	-26.18	2.0	0.25	258	39
Norway	Sleipner Vest	Produced gas	123	-215.00	-41.24	2.2	0.25	240	30
Norway	Sleipner Vest	Produced gas	120	-194.50	-38.20	2.4	0.25	216	30
Norway	Sleipner Vest	Produced gas	123	-203.50	-39.80	2.7	0.25	194	21
Norway	Sleipner Vest	Produced gas	121	-206.60	-40.31	2.6	0.25	198	27
Norway	Sleipner Vest	Produced gas	119	-204.90	-40.08	2.4	0.25	219	27
USA	Eagleford	Produced solution gas	143	-226.80	-45.70	2.1	0.25	248	31
USA	Eagleford	Produced solution gas	143	-224.90	-45.30	2.4	0.25	224	22
USA	Eagleford	Produced solution gas	143	-225.20	-45.65	3.1	0.25	160	20
USA	Eagleford	Produced solution gas	141	-244.83	-46.90				
USA	Eagleford	Produced solution gas		-243.91	-46.26	2.4	0.22	223	19
USA	Eagleford	Produced solution gas	141	-245.30	-47.00	1.6	0.25	329	47
USA	Eagleford	Produced gas	143	-168.01	-40.10				
USA	Eagleford	Produced gas	143	-167.87	-40.27	2.5	0.23	208	25
USA	Eagleford	Produced gas	143	-167.65	-40.00	1.9	0.25	278	38
USA	Eagleford	Produced gas	143	-167.60	-40.16	2.1	0.25	248	35
USA	Eagleford	Produced gas	155	-151.44	-38.09	2.8	0.25	189	21
USA	Eagleford	Produced gas	155	-162.10	-40.03	2.7	0.25	193	23
USA	Eagleford	Produced solution gas	155	-180.07	-43.03	2.5	0.25	213	22
USA	Eagleford	Produced gas	136	-150.01	-37.70	2.3	0.25	232	26
USA	La Barge - Tip Top	Produced gas		-175.10	-39.10	2.8	0.25	184	21
USA	La Barge - Tip Top	Produced gas		-190.50	-42.60	3.3	0.25	149	17
USA	La Barge - Tip Top	Produced gas		-178.90	-38.85	3.6	0.25	128	15
USA	La Barge - Hogs Back	Produced gas		-190.40	-41.47	2.8	0.25	187	22
USA	La Barge - Hogs Back	Produced gas		-172.30	-37.65	3.3	0.25	151	17
USA	Santa Barbara channel	Seeped gas		-197.60	-49.22	3.4	0.25	141	17

USA	Santa Barbara channel	Seeped gas		-197.60	-49.51	4.4	0.25	87	14
USA	Santa Barbara channel	Seeped gas		-185.60	-44.65	3.7	0.25	127	12
USA	Santa Barbara channel	Seeped gas		-190.80	-48.27	3.7	0.25	123	16
USA	AboveHayesville-Briggs	Produced gas	93	-149.01	-46.69	3.1	0.25	163	17
USA	AboveHayesville-Briggs	Produced gas	95	-155.49	-41.84	1.9	0.25	270	42
USA	AboveHayesville-Briggs	Produced gas	93	-148.00	-40.48	3.2	0.25	158	19
USA	AboveHayesville-Briggs	Produced gas	124	-175.80	-45.02	2.5	0.25	209	24
USA	AboveHayesville-Briggs	Produced gas	120	-169.97	-44.12	3.0	0.25	170	20
USA	AboveHayesville-Bethany	Produced gas	89	-144.16	-39.40	1.9	0.25	275	35
USA	AboveHayesville-Bethany	Produced gas	115	-167.76	-43.82	2.7	0.25	153	63
USA	AboveHayesville-Bethany	Produced gas	115	-176.05	-45.36	2.7	0.25	190	25
USA	AboveHayesville-Bethany	Produced gas		-175.55	-45.32	2.8	0.25	183	21
USA	AboveHayesville-Bethany	Produced gas	105	-144.22	-39.18	2.8	0.25	183	21
USA	AboveHayesville-Bethany	Produced gas	89	-144.81	-39.47	2.2	0.25	245	31
USA	AboveHayesville-Bethany	Produced gas		-145.07	-39.39	2.9	0.25	177	20
USA	AboveHayesville-Huxley	Produced gas	99	-127.28	-34.98	2.3	0.25	231	28
USA	AboveHayesville-Huxley	Produced gas	112	-124.41	-35.98	2.6	0.25	198	24
USA	AboveHayesville-Huxley	Produced gas	99	-128.24	-36.75	2.4	0.25	224	22
USA	AboveHayesville-Huxley	Produced gas	148	-132.14	-35.85	2.7	0.25	194	22
USA	AboveHayesville-Huxley	Produced gas	103	-128.41	-34.43	2.5	0.25	207	24
USA	Nebo Hemphill	Produced solution gas	57	-184.81	-59.13	4.7	0.25	75	11
USA	Nebo Hemphill	Produced solution gas	55	-183.93	-57.50	4.4	0.29	88	14
USA	Olla	Produced solution gas	39						
USA	Olla	Produced solution gas	45	-176.85	-47.60	5.8	0.31	36	10
USA	Olla	Produced solution gas	40	-176.91	-46.69	5.3	0.32	52	12
USA	Olla	Produced solution gas	44	-176.71	-49.31	5.8	0.34	37	11
USA	Nebo Hemphill	Produced solution gas	42	-180.63	-60.98	5.4	0.24	48	8
USA	Nebo Hemphill	Produced solution gas	51	-180.87	-46.01	4.7	0.21	78	9
USA	Nebo Hemphill	Produced solution gas	56	-186.84	-56.97	5.3	0.26	55	10
USA	Nebo Hemphill	Produced solution gas	50	-180.30	-49.75	6.4	0.28	18	8
USA	Nebo Hemphill	Produced solution gas	50	-182.16	-56.20	5.2	0.28	57	10
USA	Nebo Hemphill	Produced solution gas	52	-190.21	-54.47	4.3	0.38	94	18
USA	Searcy	Produced solution gas	49	-184.08	-55.47	6.0	0.28	31	9
USA	Searcy	Produced solution gas	49	-180.35	-55.56	5.3	0.27	52	10
USA	Olla	Produced solution gas	51	-174.71	-44.83	4.3	0.26	96	13
USA	Olla	Produced solution gas	39	-184.08	-48.16	4.8	0.35	71	15
Canada	Scotian Basin			-151.72	-38.40	3.7	0.25	124	15
Canada	Scotian Basin			-161.86	-41.52	4.0	0.25	106	13
Canada	Scotian Basin			-155.66	-41.12	2.9	0.25	179	21
Brazil	Potiguar Basin	Produced Solution gas	106	-126.7	-37.4	2.38	0.26	221	28

Brazil	Potiguar Basin	Produced Solution gas	71	-200.3	-45.6	3.03	0.27	167	21
Brazil	Potiguar Basin	Produced Solution gas	63	-190	-44.3	2.83	0.24	182	20
Brazil	Potiguar Basin	Produced Solution gas	63	-155.6	-42.2	3	0.25	169	19
Brazil	Potiguar Basin	Produced Solution gas	66	-150.3	-41.8	2.46	0.26	214	27
Brazil	Potiguar Basin	Produced Solution gas	88	-178.4	-44.3	2.62	0.26	200	24